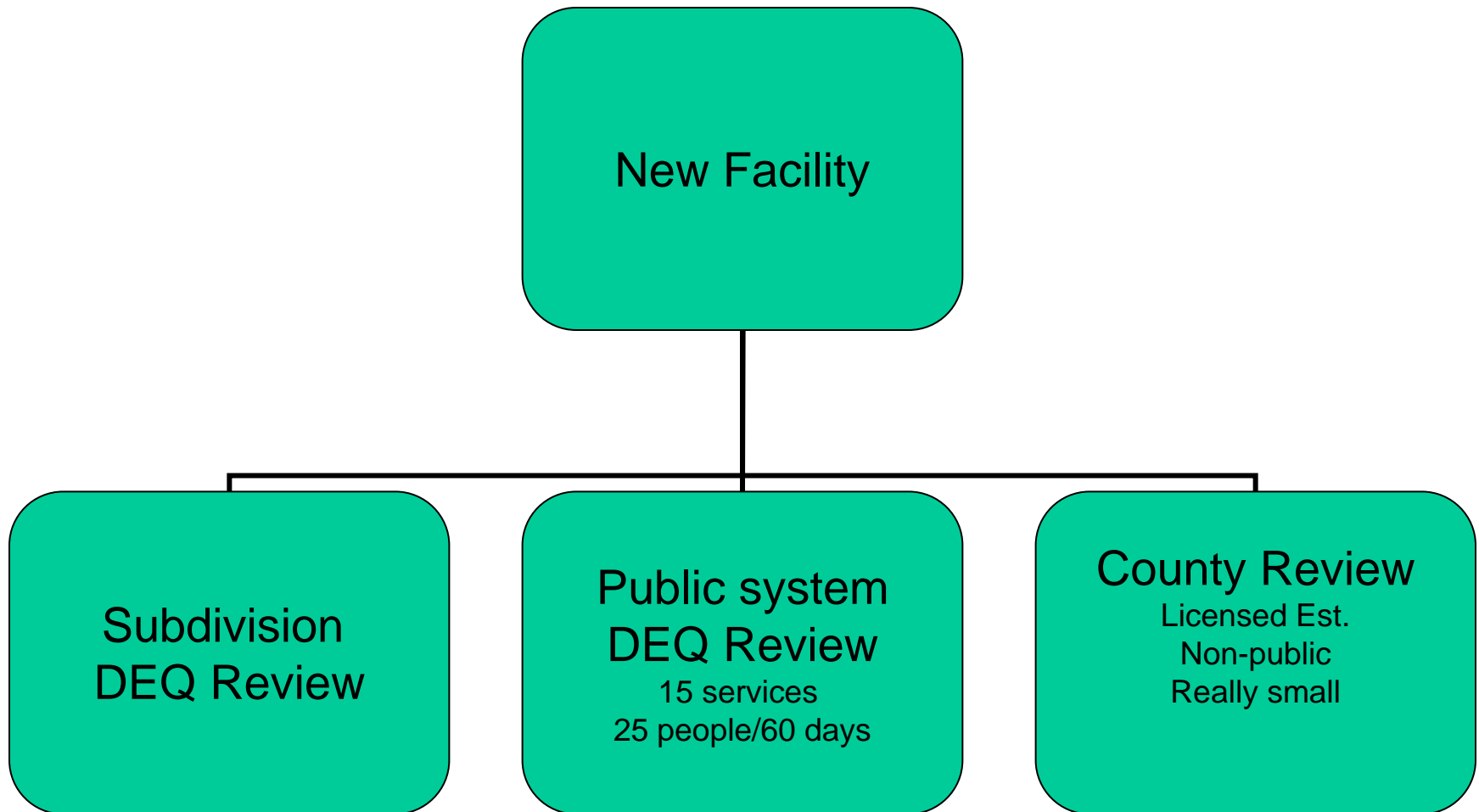


Meeting Small Public Water System Requirements

Michele Marsh, PE
Public Water and Subdivisions Bureau

Small Water System Overview



How are public water systems defined?

- **A. "*Community water system*** means a public water supply system which serves at least 15 service connections used by year-round residents or that regularly serves at least 25 year-round residents.
- **B. "*Transient non-community water system*** means a public water supply system that is not a community water system and that does not regularly serve at least 25 of the same persons for at least 6 months a year. This system primarily serves a transient population (cafes, bars, campgrounds, motels, etc.).
- **C. "*Non-transient non-community water system*** means a public water supply system that is not a community water system and that regularly serves at least 25 of the same persons over six months per year. Examples are separate systems serving workers and schools.

Non-Public Licensed Establishments

- Public Accommodation
- Bed & Breakfast
- Trailer Court
- RV-campgrounds
- Day care facility (< 25 people)

Discovery of an Existing PWS by County (that is not in SDWIS database)

- Step 1: Notify DEQ County contract manager.
- Step 2: Require (a) recent good bacti results and (b) nitrate sample results from the current calendar year.
- Step 3: DEQ activates PWS in SDWIS database and labels as “unapproved” if PWS has not gone through plan review. If PWS went through plan review, DEQ requires as-builts and a letter of certification from the designer/engineer.
- Step 4: Sanitary survey is conducted.
- Step 5: DEQ violation letter is sent to “unapproved” PWSs.
- Step 6: Review plans and specifications for “unapproved” systems. (Wastewater systems also need to be reviewed.)

Section 75-6-112 (3), MCA, states a person may not:

“Commence or continue construction, alteration, extension, or operation of a system of water supply or water distribution that is designed to be a public water supply system or a system of sewer, drainage, waste, or sewage disposal that is designed to be a public sewage system or industrial waste discharge system before the person submits to the department necessary maps, plans, and specifications for its review and the department approves those maps, plans, and specifications.”

Administrative Rules of Montana (ARM) 17.38.101 (4) states:

“A person may not commence or continue the construction, alteration, extension, or operation of a public water supply system or wastewater system, until the applicant has submitted a design report along with the necessary plans and specifications for the system to the department or a delegated division of local government for its review and has received written approval.”

EXAMPLE: Churches

- Sometimes churches are built on subdivision lots approved for non-public commercial use.
- Sometimes churches begin with only Sunday services (52 per year < 60 days) and are therefore technically **not public**.
- As they grow, churches have more weddings and funerals, putting the Church in use >60 days per year and creating a **transient, non-community PWS**, OR
- A youth group, discussion group, or civic group starts to meet weekly, putting the church in use >60 days per year and creating a **transient, non-community PWS**.
- A daycare or school is established at the church, Putting the church in use by at least 25 of the same persons over six months per year, creating a **non-transient, non-community PWS**.

Reactivation of old PWSs

- If the PWS has been inactive for two years or more and wants to reactivate:
 - PWS must submit as-built information and a brief design report to DEQ showing that the design capacity of the existing water and wastewater systems will not be exceeded.
 - DEQ will require correction of any deficiencies to meet current standards.
 - Good bacti and nitrate results before reactivation.

PLEASE



Temporary or Conditional
Approvals

Water and wastewater systems for facilities licensed by the County or approved through the Subdivision review process do not necessarily meet DEQ requirements for public water and wastewater systems.

POTENTIAL PROBLEM - DIFFERENT WATER WELL STANDARDS

- *Individual and shared wells in subdivisions must be constructed in accordance with Well Drillers' Rules and Subdivision Rules.*
 - “Shared water system” means a water system that serves or is intended to serve two living units or commercial structures. The total number of people served may not exceed 24.
- *DEQ 3 applies to non-community public water systems and multiple-user water systems in subdivisions.*
 - “Multiple user water supply system” means a non-public water supply system designed to provide water for human consumption to serve three through 14 living units or three through 14 commercial structures. The total number of people served may not exceed 24.
- *DEQ 1 applies to community water systems*

POTENTIAL PROBLEM – MIXING ZONE

- *ARM 17.30.508 (2) says “no mixing zone for ground water will be allowed if the zone of influence of an **existing** drinking water supply well will intercept the mixing zone.”*
- *Section 3.2.3.2 of DEQ 3 and DEQ 1 states “the zone of influence of a **proposed or existing** well may not be in a groundwater mixing zone...”*

POTENTIAL PROBLEM – DISTANCE TO WASTEWATER COMPONENTS

- *ARM 17.36.323, Table 3 (Subdivision Rules), only requires a setback of 50 feet between sealed wastewater components and wells that are not public or multi-user.*
- *Well Drillers Rules require a setback of 50 feet between septic tanks, underground storage tanks, and associated lines.*
- *Section 3.2.3.1 of DEQ 3 and DEQ 1 states “wells must be located at least 100 feet from sewer lines, septic tanks, holding tanks, and other structures used to convey or retain industrial, storm or sanitary waste.”*

POTENTIAL PROBLEM – 100-FOOT ISOLATION ZONE EXTENDS OUTSIDE PROPERTY

- *ARM 17.36.323, Table 3, only requires a setback of 10 feet between (any) water supply wells and property boundaries.*
- *The Well Drillers' Rules state that (any) water wells should not be located within 10 feet of property lines.*
- *Section 3.2.3.2 of DEQ 3 and DEQ 1 states “continued protection of the (PWS) well site...must extend for a radius of at least 100 feet around the well.”*

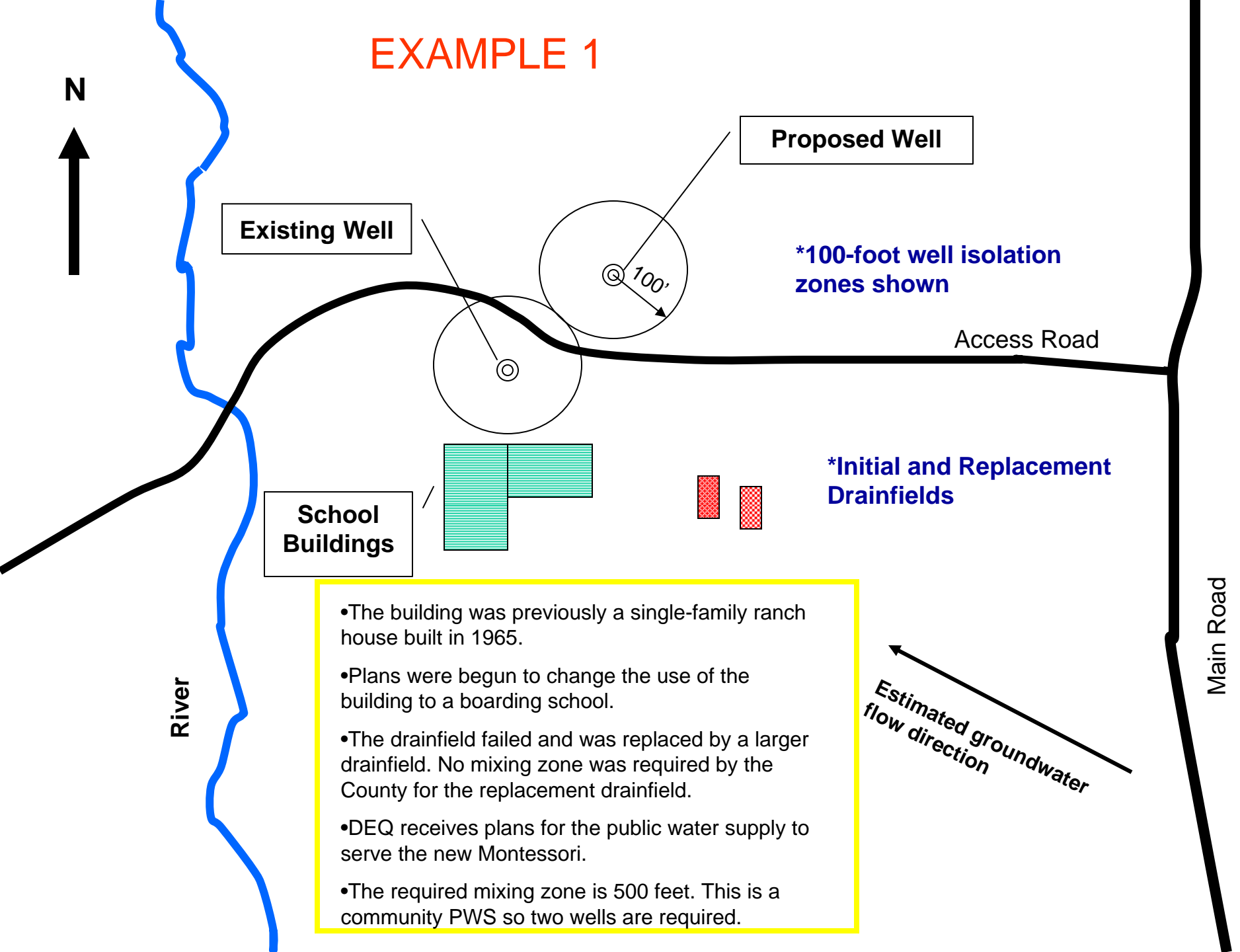
POTENTIAL PROBLEM – **STATIC WATER LEVEL LESS THAN 25 FEET**

- *The Subdivision rules do not require disinfection of individual or shared wells when the static water level is less than 25 feet.*
- *Section 3.2.5 of DEQ 3 and DEQ 1 both state that “full-time disinfection is required where the water source is an aquifer with a water table that is within 25 feet of the ground surface.”*

POTENTIAL PROBLEM – PUMPS AND HYDROPNEUMATIC TANKS IN PITS

- *The Subdivision rules do not prohibit the installation of pump rooms or hydropneumatic tanks below ground.*
- *Section 6.0 of DEQ 3 and DEQ 1 states “that subsurface pits or pump rooms and inaccessible installations must be avoided.”*
- *Section 6.2 of DEQ 1 states that “both raw and finished water pumping stations must have a floor elevation of at least six inches above finished grade.”*
- *Both DEQ 3 and DEQ 1 require that hydropneumatic tanks be located above normal ground surface.*

EXAMPLE 1



Existing Well

Proposed Well

***100-foot well isolation zones shown**

Access Road

School Buildings

***Initial and Replacement Drainfields**

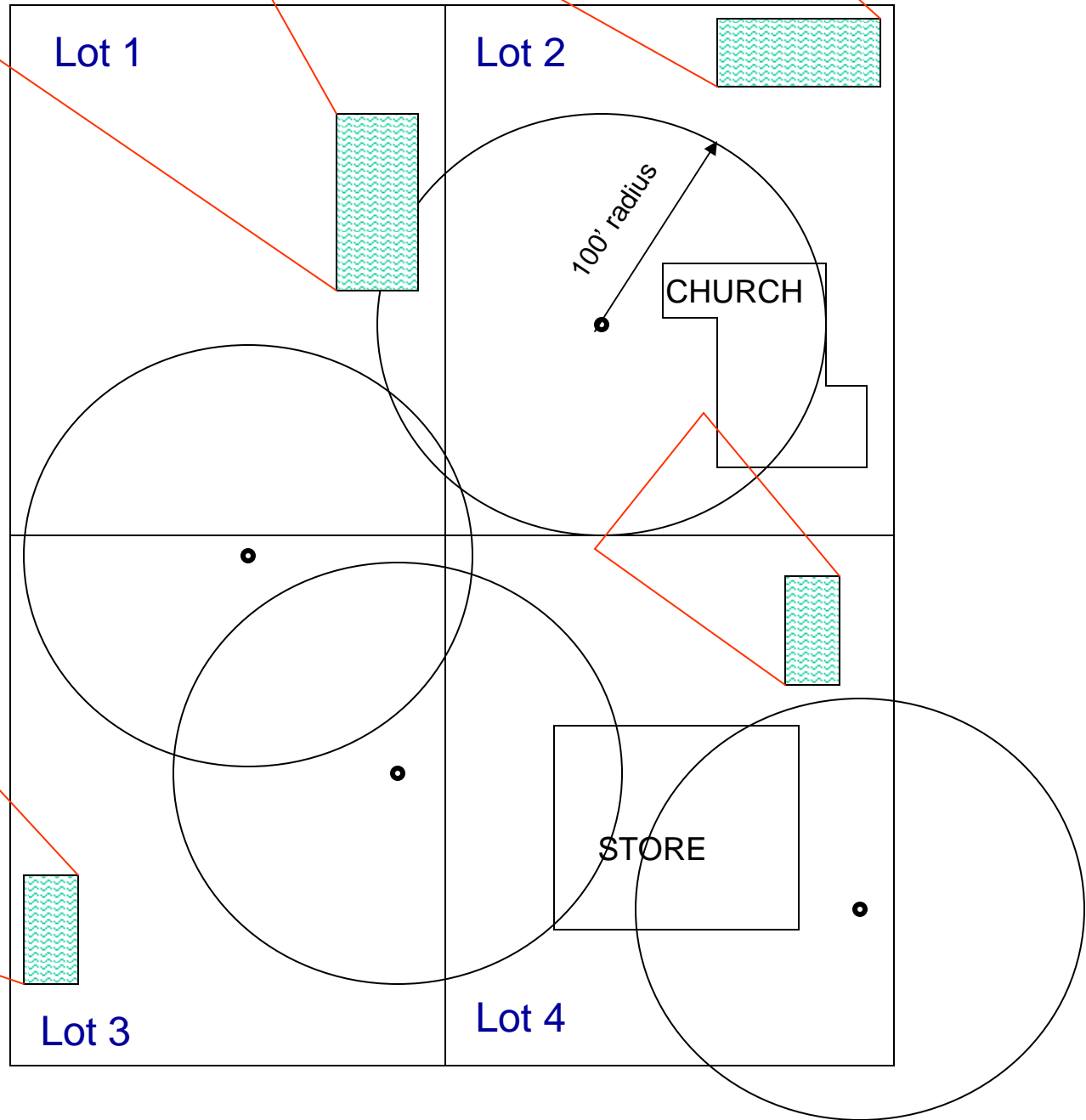
Main Road

Estimated groundwater flow direction

- The building was previously a single-family ranch house built in 1965.
- Plans were begun to change the use of the building to a boarding school.
- The drainfield failed and was replaced by a larger drainfield. No mixing zone was required by the County for the replacement drainfield.
- DEQ receives plans for the public water supply to serve the new Montessori.
- The required mixing zone is 500 feet. This is a community PWS so two wells are required.

EXAMPLE 2

- Lot 2 was approved for a non-public commercial bldg. through Subdivisions.
- A church was built instead.
- A licensed daycare was installed in the church.



Deviations:

ARM 17.38.101(4)(i) *“the department may grant a deviation from the standards referenced in (4)(a) through (f) when the applicant has demonstrated to the satisfaction of the department that strict adherence to the standards of this rule is not necessary to protect the public health and the quality of state waters.”*

- **DEQ 3, Standard 1.4.1 states:**

- Deviations must be in writing and identify the specific section and deviation requested. The form may be found at:

<http://www.deq.mt.gov/wqinfo/pws/PlanReviewEngineer.asp>

- Adequate justification must be provided. “Professional opinion” is not adequate justification.
- Three people from DEQ will review.

Source Capacity

- Hydropneumatic pressure tank systems: The well(s) must supply peak instantaneous demand, as determined by a fixture unit analysis or other accepted method.
- Storage tank systems: The well(s) must supply the design maximum day demand. The minimum storage requirement must equal the average daily demand for a 24-hour period plus any required fire demand.

PWS-6 Report

- Required with all DEQ-1 and DEQ-3 submittals
- Defines source water protection issues for public wells
- Templates for PWS-6 reports available on the DEQ website
- ***PWS-6 Report*** – ***required by DEQ*** – must be included with plans/specifications

What Is Source Water Protection?

- **Delineation** (Mapping) of land areas that contribute water to wells or surface water intakes.
- **Inventory** of potential sources of **regulated** contaminants within those areas.
- **Assessment** of how susceptible the PWS is to each potential contaminant source.
- **Present Results**
 - PWS-6 Reports focus on just the new source
- **Distribute Reports**
 - PWS-6 – Included in Plans and Specs submitted to DEQ

PWS-6 Terminology:

- ***Regulated Contaminants*** - Constituents monitored by a PWS. Examples - *coliform bacteria* and *nitrate* for transient PWS.
- ***Potential Contaminant Source*** - Land use, activity, business, or discharge point that uses, stores, or discharges a regulated contaminant.
- ***Source Water*** – “Raw” water used by a PWS. Example - ground water, surface water, springs, or some combination thereof.

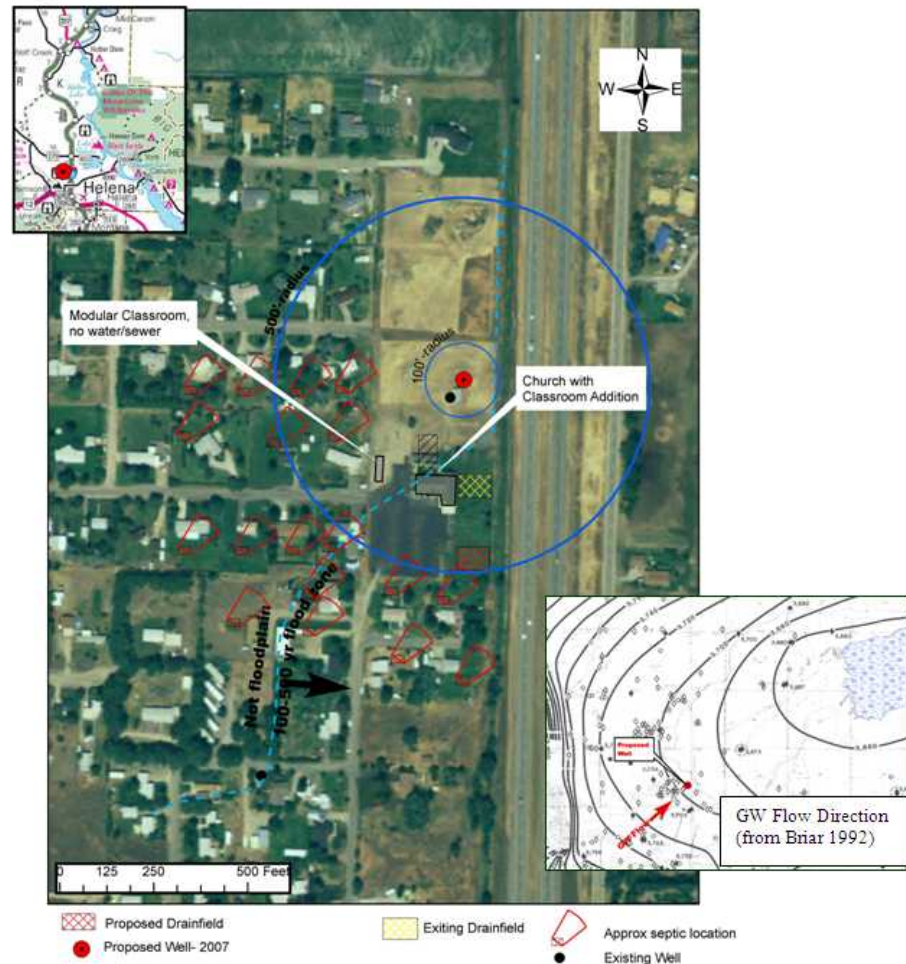
SWP Example

A Church in
Lewis and Clark County

The Site Map

Figure 1

Our Lady of the Valley



**PWS 6 Report
For
Our Lady of the Valley Catholic Church
Helena Montana
(April 24, 2007)**

The current water and wastewater facilities at Our Lady of the Valley Catholic Church described in this report have served the parish in the Helena Valley since the late 1970s. In 2007, the Montana Department of Environmental Quality (DEQ) became aware the church had surpassed the population served threshold that triggers classification of a water system as a public water supply (PWS) and is subject to regulation under the federal Safe Drinking Water Act (any water system serving twenty five or more persons per day for 60 days in a calendar year is a public water system that must meet certain design and operation standards). The existing well and the existing septic system at the church do not meet the minimum design standards so a new well and septic system are proposed. The plans and specifications for the water system must meet certain DEQ design standards including Department Circular PWS 6 and this report addresses the requirements of that circular.

The church is classified as a transient PWS. Contaminants of concern for a transient PWS include only those that pose an acute health risk hence are limited to certain microbiological organisms and nitrate.

INTRODUCTION:

Owner name and address:

**Roman Catholic Bishop of Helena
PO BOX 1729
Helena MT 59624-1729
406-458-6114**

Facility name and address

**Our Lady of the Valley Catholic Church
1502 Shirley Road
Helena MT 59602
(see also Figure 1)**

Primary contact person and phone number

**Paul Tschida
5570 N, Montana Ave
Helena MT 59602
406-458-9633**

Date of report.

April 24, 2007

If parcel is less than 20 acres in size, provide copy of plat approval statement with lot layout map.

The church is on PARCEL 2 PER C/S #507671/O which is 4.843 acres in size. The plat approval statement is not relevant since the new water and new wastewater systems are public and will be review/approved by the Montana Department of Environmental Quality.

WATER SYSTEM INFORMATION:

Describe the location and nature of the water supply (i.e. subdivision, day care, food processor, other business, etc).

The church serves a parish of approximately 450 people for weekend services and occasional to frequent weekday events. Not all parishioners attend all services. The church is located in T11NR3WS32. Generally, the church is between North Montana Avenue and I-15 about 5 miles north of Helena (see inset on Figure 1).

Identify how many people will be served (including workers and clients)

Approximately 200 parishioners attend services on a typical Sunday. The church facility is occasionally used by community groups such as the Boy Scouts for evening meetings. The church has two sets of restrooms and a small, domestic scale kitchen for food preparation.

Indicate the estimated water use in gallons per day.

For the purposes of this report, potable water demand is estimated at 10 gallons per day per person or 2,000 gallons per day (10 gpd/person x 200 persons) plus irrigation.

Describe the location of the well

The proposed well will be located approximately 100 feet northeast of the northeast corner of building (see Figure 1). The proposed well site is at more than 100 feet from the building sewer service connection, septic tank, existing septic tank and drainfield, and proposed septic system including replacement drainfield area. A brief description of aquifer conditions is excerpted below (Morrison Maierle. Monopoly Court PWS 6 Report. 2003)

Describe any water treatment devices

The water table is expected to be around 12'-15' below the ground surface at the proposed well site so full-time disinfection will be utilized

Show the location of all parts of the septic system for this property and adjacent properties on the map.

The proposed wastewater system will be a public transient system engineered to meet DEQ standards. The system will be a design using pressure dosing (see Figure 1 for approximate location)

DELINEATION:

Draw a 500-foot circle around the proposed drinking water source on a map. This is your "inventory region".

See Figure 1 for the inventory region.

Provide a well log.

This is a proposed system so a well log is not available. No well log is available for the existing well which will continue to be used for irrigation purposes. Attachment 1 is a well log for a nearby well (800' north) and may be representative of conditions expected in the vicinity of the church.

Provide a recent lab analysis for coliform bacteria and nitrate.

Water quality data will be provided upon completion of the well and prior to using the well as a drinking water source. It should be noted that the existing well is not properly sealed at the casing top (it is open) and continually tests positive for coliform bacteria. Nitrate analysis in April 2007 showed concentration < 2.5 mg/L.

If this is a proposed well, describe the intended depth and grout placement method.

The well will be around 100' TD and will be grouted to at least 18' below ground surface (BGS). The static water level in the underlying alluvium is expected to be around 12'-16' BGS (. Discontinuous clay layers may be encountered and the well is expected to be completed into a producing zone around 65'-85' BGS. See Attachment 1 for a nearby well log.

INVENTORY:

Describe all land uses within the 100-foot area around the well. This needs to be detailed.

The 100-foot well control zone includes the irrigation well, a grassy lawn area and small storage shed. The irrigation well is in a pit and the casing top is open. The submersible pump will be removed and a new sanitary seal installed so the well will not be considered to be a potential contaminant source. The grassy area is irrigated occasionally and mowed, but no chemical weed control occurs here. A more highly maintained lawn is located east of the church building and provides a play area or place for outdoor activities. Weed control and fertilizer applications occur only in this area which is more than 100 feet from the proposed well.

Describe all land uses within a 500-foot radius of the well. This can be a more general description.

Land use in this area includes the church buildings and parking lot. Stormwater drainage off the parking lot is not directed to shallow infiltration structures or through any type of conveyance but is allowed to run-off into the adjacent grassy areas well outside the 100-foot control zoned. The church will be served by a new large capacity septic system located 150 feet southeast of the proposed well. The existing septic tanks and/or grease trap will be removed or filled in place. The new wastewater system location is lateral to the well based on ground water flow direction. Land use beyond the church property is suburban residential that uses individual wells and septic systems. The closest domestic septic system is about 300 ft from the well control zone. Residential septic system density is moderate.

On a map or air photo, show general land uses described as: sewer residential, sewer commercial, unsewer residential, unsewer commercial, irrigated agriculture, grassland, or forest ("sewered means connected to a city, town or sewer district sewer system, unsewered means septic systems are used

See Figure 1.

SUSCEPTIBILITY: Completed by the Review Authority. Susceptibility is based on the type of contaminant source, location, and aquifer conditions. Susceptibility is assessed by considering the relative hazard of significant potential contaminant sources tempered by the presence of barriers to contaminant transport. For this proposed PWS, the large capacity septic system that will serve the church is a high hazard potential contaminant source. The location is lateral relative to the proposed well and the well intake will be at least 50 feet below the average static water level. The mixing zone for the drainfield is located east of the well and does not intercept the well control zone. With two barriers, susceptibility is considered to be moderate.

The hazard posed by area septic systems is considered to be moderate. The well intake will be at least 50 feet below the average static water level. With one barrier, susceptibility is considered to be moderate. There are no drainfield mixing zones that encroach on the well control zone.

Source	Contaminants	Description (<i>Location and nature of hazard</i>)	Hazard Rating	Barriers	Susceptability
<i>Large Capacity Septic System Serving Church</i>	<i>Pathogens and Nitrates</i>	<i>Septic System Serving Church</i>	<i>High</i>	<i>-Lateral Location -Well intake > 50' BGS</i>	<i>Moderate</i>
<i>Area Septic Systems</i>	<i>Pathogens and Nitrates</i>		<i>Moderate</i>	<i>Well intake > 50' BGS</i>	<i>Moderate</i>

LIMITATIONS:

Identification of potential contaminant sources is limited to available information. Unregulated activities or unreported contaminant releases may not be considered in this report. The delineation method utilizes simplifying assumptions that may not fully represent complex ground water flow systems but is intended to be protective of public health.